UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58506

CSAH NO. 7

OVER THE

SNAKE RIVER

DISTRICT 1 - PINE COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 73)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 58506, Piers 1 through 9, were found to be in satisfactory to fair condition. No defects of major structural significance were observed, except for a considerable amount of bracing defects and failures, which have compromised the lateral stability of the bridge. Light to moderate accumulations of timber drift were observed at Piers 2, 3, 4, 5, 7, and 8. The channel bottom around the substructure units and the shorelines appeared to be in stable condition with no significant scour or appreciable changes since the previous inspection. An adjacent retaining wall at the southeast shoreline was leaning into the channel and has failed.

INSPECTION FINDINGS:

(A) It was observed that the retaining wall located to the east of Pier 8 was leaning into the channel and has failed.

(B) In general, the cross-bracing between the piles of each pier was in fair to poor condition with splitting typically at one or more brace connections on each pier. Many of the pier braces also displayed moderate to heavy section loss and related connection failures.

(C) The majority of the timber piles were in fair condition with weathering and random vertical checking present with widths of up to 1/4 inch. The only significant pile distress found was as follows:

* The pile at the center of Pier 2 was cracked, splintered and soft to a depth of 1/2 inch. This condition existed from 1 foot above the waterline to the channel bottom. Below this 1/2 inch softer outer layer, the wood material was sound and firm.

* The outer 1.5 inch shell of the end pile at west end of Pier 3 was cracked and splintered. This condition was present from 6 inches below the waterline to 1.5 feet above the waterline.

* The outer 2 inch shell was cracked, splintered, soft, and delaminated at the second pile from the west end of Pier 4.

* The westernmost pile on the south side of Pier 7 was splintered over a 12 inch high by 6 inch wide by 3/4 inch deep area. This area was located 2 feet below the waterline. The material beneath the splintered material was soft to an estimated depth of 1/4 inch. The total loss of cross-section at this location was estimated to be between 10 and 20 percent.

(D) Light accumulations of timber debris, consisting of 6 inch diameter and smaller limbs and branches, was observed at the upstream noses of Piers 2, 3, 4, and 7.

(E) Moderate accumulation of timber debris, consisting of 1 foot diameter and smaller logs and branches, was observed around the upstream pile of Piers 5 and 8 extending from the channel bottom to the waterline.

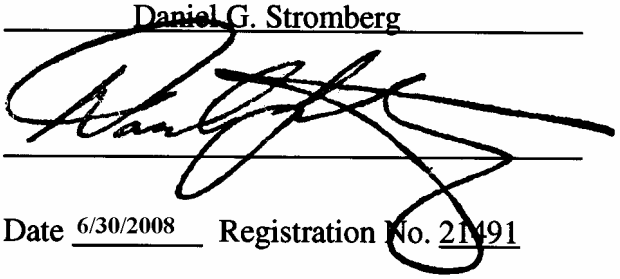
RECOMMENDATIONS:

(A) The cracked, split, and deteriorated pier cross-bracing should be replaced to restore the lateral stability of the piers.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

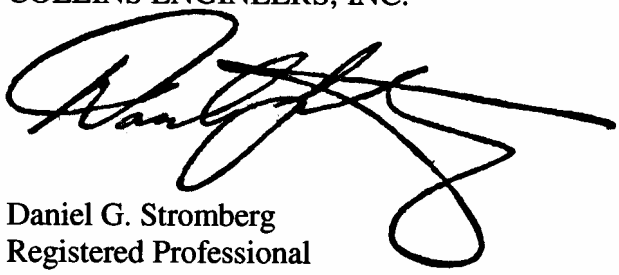
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 58506

Feature Crossed: Snake River

Feature Carried: CSAH No. 7

Location: District 1 - Pine County

Bridge Description: The superstructure consists of ten spans of timber deck on multiple timber stringers supported by nine timber pile piers and two timber pile abutments. The piers are numbered 1 through 9 starting from the north end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 23, 2007

Weather Conditions: Cloudy, 81^{o} F

Underwater Visibility: 4.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 9.

General Shape: Each pier consists of a timber cap supported by timber piles. Timber cross-bracing is present between the piles. The number of piles at each pier varies from two rows of five piles (Piers 3 and 7) to one row of seven piles (all other piers). In addition, Piers 3 and 7 have a steel nosing pile at the upstream end.

Maximum Water Depth at Substructure Inspected: Approximately 6.7 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at east end of Pier 8.

Water Surface: The waterline was approximately 9.2 feet below reference.
Water Elevation = 933.3.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code J/97

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

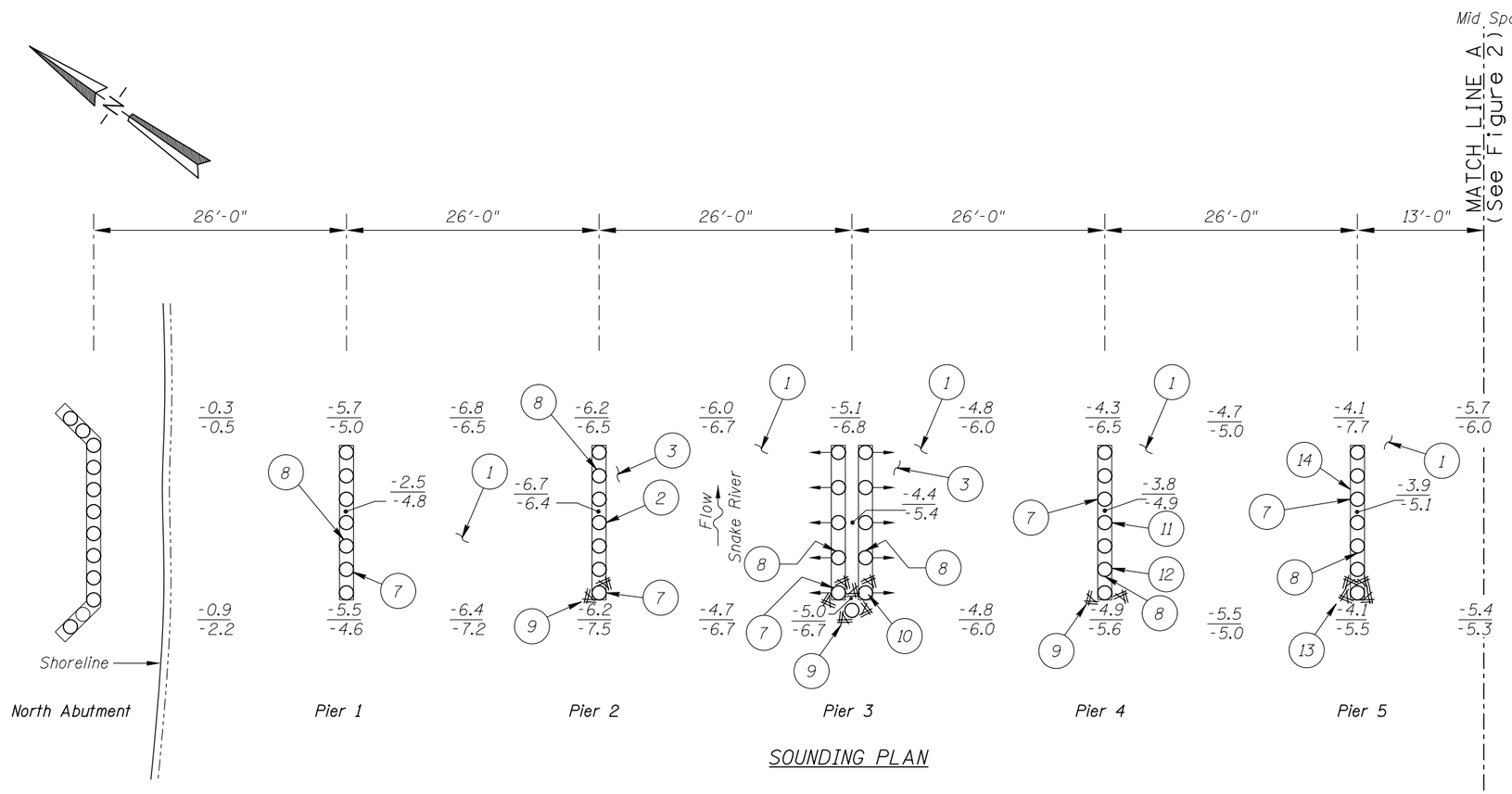
Photograph 1. View of North Abutment, Looking Northwest.

Photograph 2. View of Pier 1, Looking Northeast.

Photograph 3. View of Pier 2, Looking Northeast.

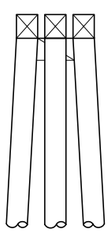
Photograph 4. View of Pier 3, Looking Northeast.

Photograph 5. View of Pier 4, Looking Northeast.

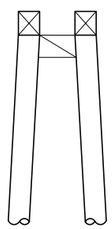


SOUNDING PLAN

TYPICAL END VIEW OF PIERS 1,2,4,6,8 & 9



TYPICAL END VIEW OF PIERS 3 & 7 UPSTREAM



TYPICAL END VIEW OF PIERS 3 & 7 DOWNSTREAM

GENERAL NOTES:

1. Piers 1 through 9 were inspected underwater.
2. At the time of inspection on August 23, 2007, the waterline was located 9.2 feet below the top of cap on the downstream end of Pier 8. This corresponds to a waterline elevation of 933.3.
3. Soundings indicate the water depth at the time of the inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at the mid points between the substructure units.

Legend

-7.0 / -7.1 Sounding Depth (8/23/07) / Sounding Depth (9/25/02)

Timber Pile

Battered Timber Pile

Timber Debris

Note:

All soundings based on 2007 waterline location.

INSPECTION NOTES:

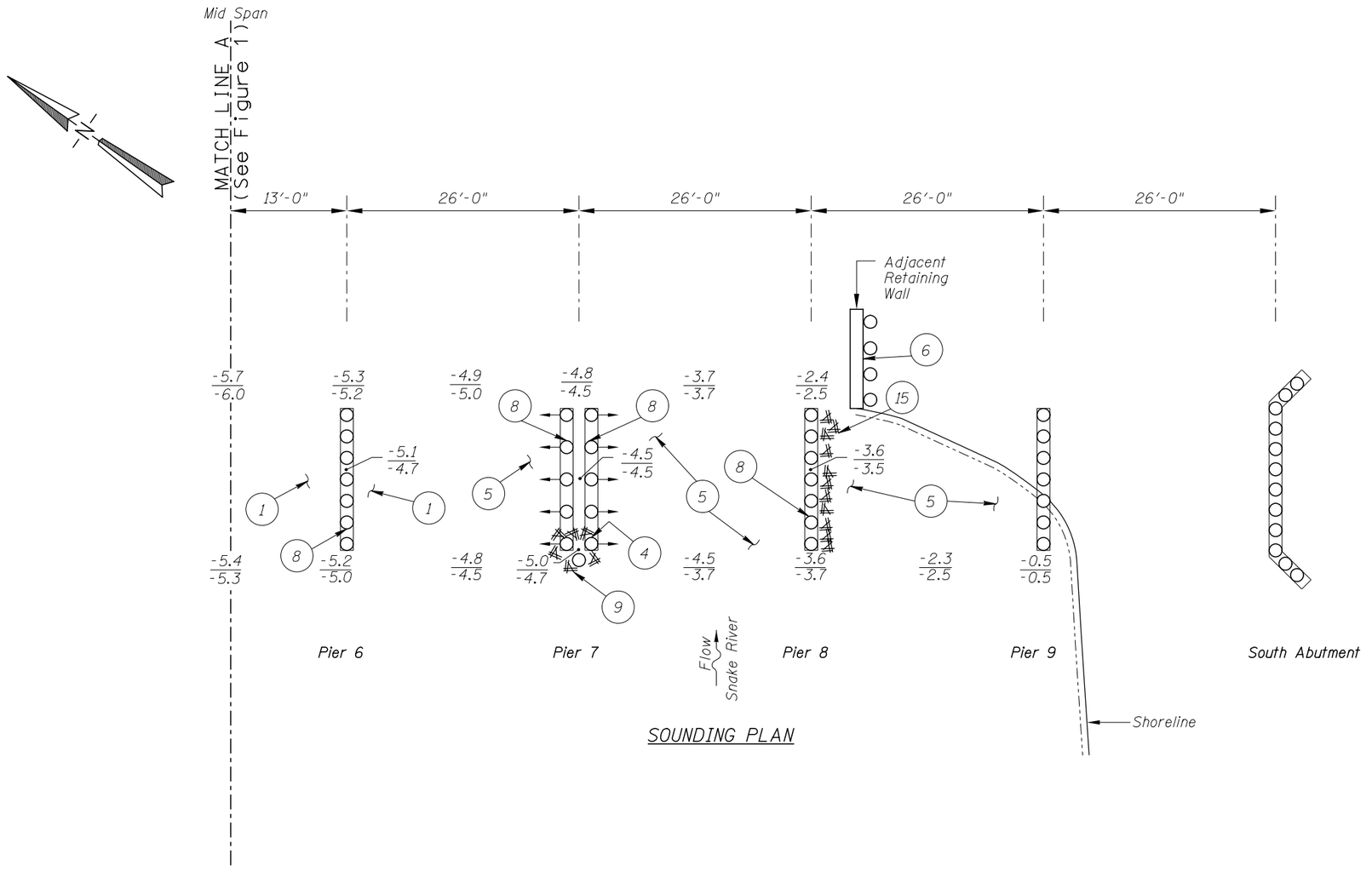
1. The channel bottom consisted of silty sand with random scattered riprap and up to 6 inches of probe rod penetration.
2. The outer 1/2 inch shell of the fourth pile from the west end of pier was cracked, splintered, soft, and delaminated. This condition was present from the channel bottom to 1 foot above the waterline. Probing revealed the wood beneath this outer shell to be sound.
3. The channel bottom at Piers 2 and 3 consisted of sand and riprap up to 6 inches in diameter with no appreciable probe rod penetration.
4. A 12 inch high by 6 inch wide by 3/4 inch deep portion of the outer shell of this pile has splintered outward. The wood beneath this area was soft to a depth of 1/4 inch. The estimated loss in cross sectional area was 10 to 20 percent. This condition occurred at 2 feet below the waterline.
5. The channel bottom at Piers 7 through 9 consisted of a mixture of gravel and riprap with no appreciable probe rod penetration.
6. The east-west retaining wall at this location was leaning and has failed.
7. Brace at connection to pile heavily cracked and deteriorated.
8. All of the piles exhibited random checking up to 1/4 inch wide, and a softer out pile shell up to 1/4 inch thick with 1/4 inch wide splits.
9. Light accumulation of timber debris consisting of 6 inch diameter and smaller logs and branches was observed at the upstream and downstream noses of Piers 2, 3, 4, and 7.
10. The outer 1 1/2 inch shell of end pile at west end of Pier 3 was cracked and splintered. This condition was present from 6 inches below the waterline to 1 1/2 feet above the waterline.
11. The horizontal bracing was heavily cracked and deteriorated at south side of Pier 4 with 50 percent loss of section at west end of Pile 4.
12. The outer 2 inch shell was cracked, splintered, soft and delaminated at the second pile from the west of Pier 4. It extended from channel bottom to 1.5 feet above the waterline.
13. Moderate drift consisting of 1 foot diameter and smaller logs and branches was observed around upstream pile at Pier 5 from channel bottom to waterline.
14. The diagonal bracing connection at waterline is broken at the third pile from the East at Pier 5. New bracing was installed.
15. Pier 8 has a moderate drift at south side consisting of 6 inch diameter and smaller limbs and branches. It extended from channel bottom to waterline.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 58506
OVER THE SNAKE RIVER
DISTRICT 1, PINE COUNTY

INSPECTION AND SOUNDING PLAN I

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 52210073		Figure No.: 1



SOUNDING PLAN

Notes:

Refer to Figure 1 for General Notes.

Refer to Figure 1 for Inspection notes.

All soundings based on 2007 waterline location.

Legend

-7.0	Sounding Depth (8/23/07)
-7.1	Sounding Depth (9/25/02)
○	Timber Pile
○→	Battered Timber Pile
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 58506
OVER THE SNAKE RIVER
DISTRICT 1, PINE COUNTY

INSPECTION AND SOUNDING PLAN II

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 52210073		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 58506 WEATHER: Cloudy, 81° F

WATERWAY CROSSED: Snake River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER_____

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 1:25 p.m.

TIME OUT OF WATER: 1:55 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 4.0 feet

DEPTH 6.7 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 through 9

REMARKS: Overall, the piles were in satisfactory to fair condition with random 1/4 inch checking and splitting. The timber bracing at all piers was in fair to poor condition with splitting, section loss, and damage at the connections. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber drift were observed around the upstream pile of Piers 2, 3, 4, 5, 7, and 8. The channel bottom consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

FURTHER ACTION NEEDED: X YES _____ NO

Replace the cracked, split, and deteriorated pier cross-bracing to restore lateral stability of the piers.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 58506
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Snake River

INSPECTION DATE August 23, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.7’	6	N	N	8	5	6	8	7	7	N	7	N	N	6	N	N	N
	Pier 2	6.7’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 3	5.1’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 4	4.9’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 5	4.1’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 6	5.3	6	N	N	8	5	6	8	N	N	N	8	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piles were in satisfactory to fair condition with random 1/4 inch checking and splitting. The timber bracing at all piers was in fair to poor condition with splitting, section loss, and damage at the connections. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber drift were observed around the upstream pile of Piers 2, 3, 4, 5, 7, and 8. The channel bottom consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 58506
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Snake River

INSPECTION DATE August 23, 2007

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CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 7	5.0’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 8	3.6’	6	N	N	8	5	6	8	N	N	7	7	N	N	6	N	N	N
	Pier 9	0.5’	6	N	N	8	5	6	8	7	N	N	7	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piles were in satisfactory to fair condition with random 1/4 inch checking and splitting. The timber bracing at all piers was in fair to poor condition with splitting, section loss, and damage at the connections. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber drift were observed around the upstream pile of Piers 2, 3, 4, 5, 7, and 8. The channel bottom consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

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